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AECOM Australia Pty Ltd
17 Warabrook Boulevard
Warabrook NSW 2304
PO Box 73
Hunter Region MC NSW 2310
Australia
www.aecom.com

+61 2 4911 4900 tel
+61 2 4911 4999 fax
ABN 20 093 846 925

15 May 2020

Chris Schneider
Managing Director
National Ceramic Industries Australia
PO Box 765
Maitland NSW 2320

Dear Chris,

**Environmental Monitoring for National Ceramic Industries Australia - April 2020**

Please find enclosed the documentation for the environmental monitoring carried out for National Ceramic Industries Australia during April 2020. Sampling methodology and adopted assessment criteria are detailed below.

## 1.0 Sampling Methodology

Sampling was performed by AECOM Australia Pty Ltd (AECOM) and sample analysis was carried out by ALS NATA accredited laboratory. All sampling and analysis was carried out in accordance with Environmental Protection Authority (EPA) approved methods with reference to the following Australian Standards:

- Monitoring of fine suspended particulates ($PM_{10}$) on the EPA six day cycle in accordance with:
  - AS/NZS 3580.9.6 (2015) Methods for the Sampling and Analysis of Ambient Air – Determination of Suspended Particulate Matter – $PM_{10}$ High Volume Sampler with Size Selective Inlet - Gravimetric Method.
- Monitoring of fluorides in ambient air in accordance with:
  - AS/NZS 3580.13.2 (2013) Determination of fluorides—Gaseous and acid-soluble particulate fluorides—Manual, double filter paper sampling.
- Meteorological monitoring in accordance with:
  - AS 3580.1.1 (2016) – *Methods for sampling and analysis of ambient air – Part 1.1 – Guide to siting air monitoring equipment; and*
  - AS 3580.14 (2014) – *Methods for sampling and analysis of ambient air – Part 14: Meteorological monitoring for ambient air quality monitoring.*
- Monitoring of surface water quality in accordance with:
  - AS/NZS 5667.1:1998(R2016) *Guidance on the design of sampling programs, sampling techniques and the preservation and handling of samples*; and
  - AS/NZS 5667.4:1998(R2016) *Guidance on sampling from lakes, natural and manmade*.

## 2.0 Assessment Criteria

Suspended particulate loads are assessed against the impact assessment criteria defined in the Project Approval conditions (09_0006 – National Ceramic Industries Australia Tile Manufacturing Facility Expansion Project, 19 January 2012). The assessment criteria for $PM_{10}$ (particulate matter with an aerodynamic diameter of less than 10 $\mu$m) are:

- 50 $\mu g/m^3$ over a 24-hour period; and
- 30 $\mu g/m^3$ as an annual average.

Ambient fluoride concentrations are assessed against the guidelines defined in NSW EPA *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* (NSW EPA (2016)). The NSW EPA impact assessment criteria for ambient fluoride are:

- 2.9 $\mu g/m^3$ over a 24-hour period; and
- 1.7 $\mu g/m^3$ over a 7-day period.

Surface waters are assessed in accordance with default trigger values for physical and chemical stressors for southeast Australia in the *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZG, 2018). These values are:

- pH in the range of 6.5 - 8.5 (Table 3.3.2 - NSW Lowland River); and
- Electrical conductivity (EC) in the range of 125 – 2200 µS/cm (Table 3.3.3 - NSW Lowland River).

## 3.0 Monitoring Results

Monitoring results for the month of April 2020 are presented in the attachments to this letter. Monitoring results for the preceding two months are also presented to demonstrate quarterly trends in results.

The April 2020 monitoring results show that all ambient $PM_{10}$ results were below the short-term impact assessment criterion (50µg/m$^3$) as defined in the DPIE Project Approval (Schedule 3, Condition 15, Table 2) with the exception of the North West $PM_{10}$ result for 26 April 2020.

The North West monitor returned a $PM_{10}$ result of 56.9 µg/m$^3$ on 26 April and as detailed in an Environmental Incident letter to the DPIE on 8 May, elevated regional dust levels and north westerly winds indicate NCIA was not a contributor to this result.

The $PM_{10}$ rolling annual average concentration at the South East site remains below the Project Approval annual criterion of 30 µg/m$^3$ with an average of 24.1 µg/m$^3$ following the April monitoring period. The North West annual average is currently above the criteria at 36.2 µg/m$^3$ following the completion of the April monitoring period, largely due to elevated results recorded during November and December 2019 caused by regional heavy bushfire smoke.

Fluoride results for April remain below the relevant assessment criteria at both the North West and South East monitoring sites with no exceedances of either the 24 hour or 7 day criteria this month.

The adopted ANZG 2018 guidelines for pH and conductivity are the default trigger values for slightly disturbed aquatic ecosystems in NSW lowland rivers. With the exception of the 23 April result, pH measurements for April were recorded above the ANZG guideline 8.5 upper limit. Importantly, Pond 4 was not observed to be discharging on this day. All conductivity measurements were within the relevant ANZG guidelines for April. Water temperature was also measured weekly however no guideline is available for assessment.

The monitoring locations, monitoring results and plots can be found attached including the wind rose for April as a whole and a wind rose for 26 April to show the meteorology on the day of the $PM_{10}$ exceedance. Laboratory certificates, field sheets and calibration data along with relevant meteorology data can be provided on request.

If you require any further information, please contact Cye Buckland on 0488 777 160.

Yours faithfully,

Cye Buckland
Senior Environmental Technician
cye.buckland@aecom.com

Direct Dial: +61 2 4911 4829
Direct Fax: +61 2 4911 4999

Paul Wenta
Principal Scientist - Air Quality
paul.wenta@aecom.com

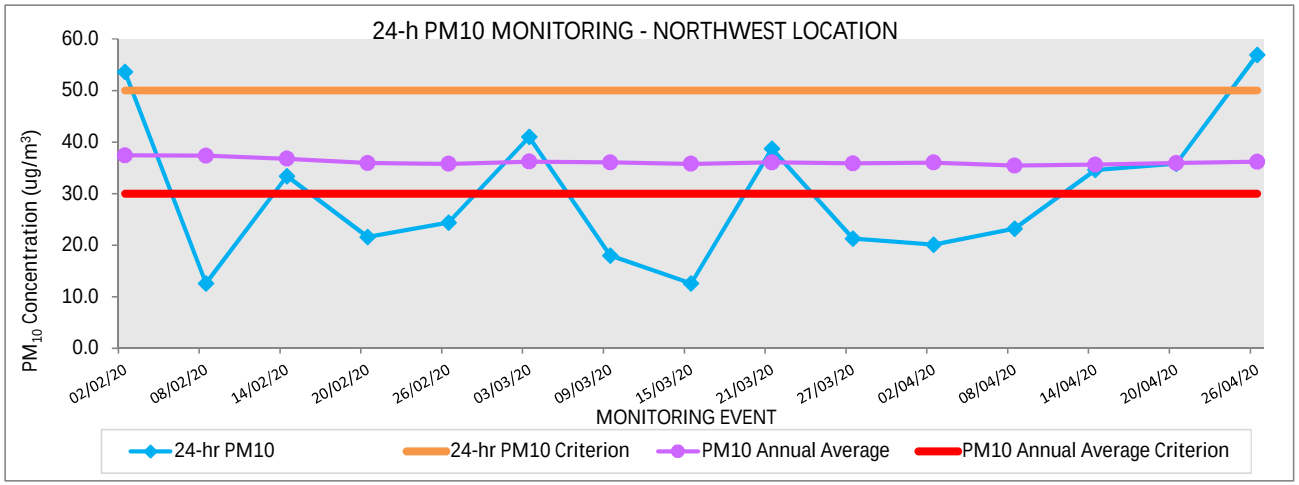
Mobile: +61 438 670 281
Direct Dial: +61 2 4911 4855
Direct Fax: +61 2 4911 4999

encl: Monitoring data tables and charts, monitoring locations, wind roses

# North West Monitoring Location - 24 hour PM10 Monitoring

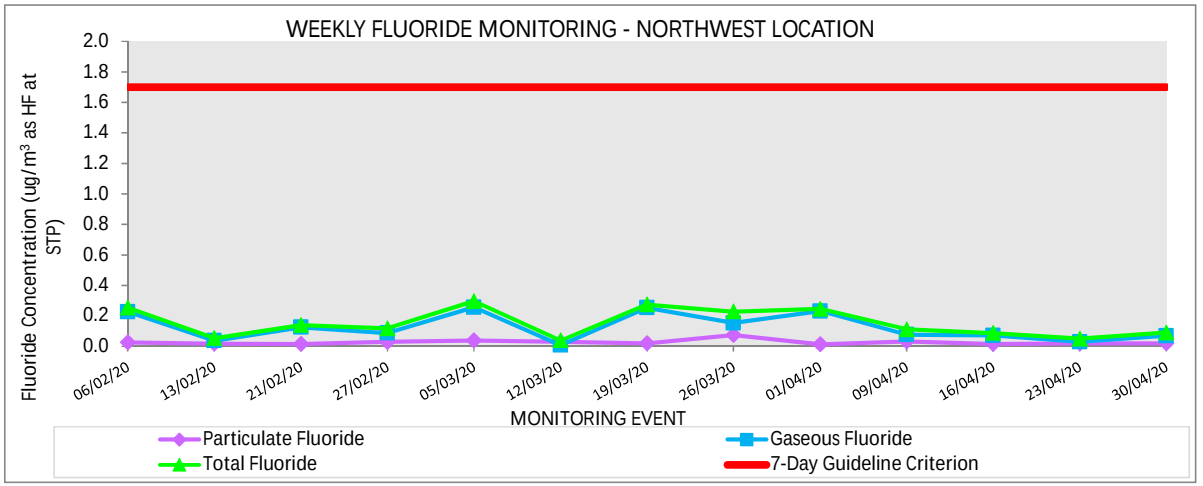
| North West - 24 hour PM10 Monitoring | | | | |
|---|---|---|---|---|
| February 2020 to April 2020 | | | | |
| **Monitoring Event** | **24-hr $PM_{10}$** | **24-hr $PM_{10}$ Criterion** | **$PM_{10}$ Annual Average** | **$PM_{10}$ Annual Average Criterion** |
| | **(µg/m3)** | **(µg/m$^3$)** | **(µg/m$^3$)** | |
| 2-Feb-20 | **53.6** | 50 | **37.4** | 30 |
| 8-Feb-20 | 12.6 | 50 | **37.4** | 30 |
| 14-Feb-20 | 33.4 | 50 | **36.8** | 30 |
| 20-Feb-20 | 21.6 | 50 | **35.9** | 30 |
| 26-Feb-20 | 24.4 | 50 | **35.8** | 30 |
| 3-Mar-20 | 41.0 | 50 | **36.2** | 30 |
| 9-Mar-20 | 18.0 | 50 | **36.1** | 30 |
| 15-Mar-20 | 12.6 | 50 | **35.8** | 30 |
| 21-Mar-20 | 38.7 | 50 | **36.1** | 30 |
| 27-Mar-20 | 21.3 | 50 | **35.9** | 30 |
| 2-Apr-20 | 20.1 | 50 | **36.0** | 30 |
| 8-Apr-20 | 23.2 | 50 | **35.4** | 30 |
| 14-Apr-20 | 34.6 | 50 | **35.6** | 30 |
| 20-Apr-20 | 35.8 | 50 | **35.9** | 30 |
| 26-Apr-20 | **56.9** | 50 | **36.2** | 30 |

***Bold denotes exceedance**



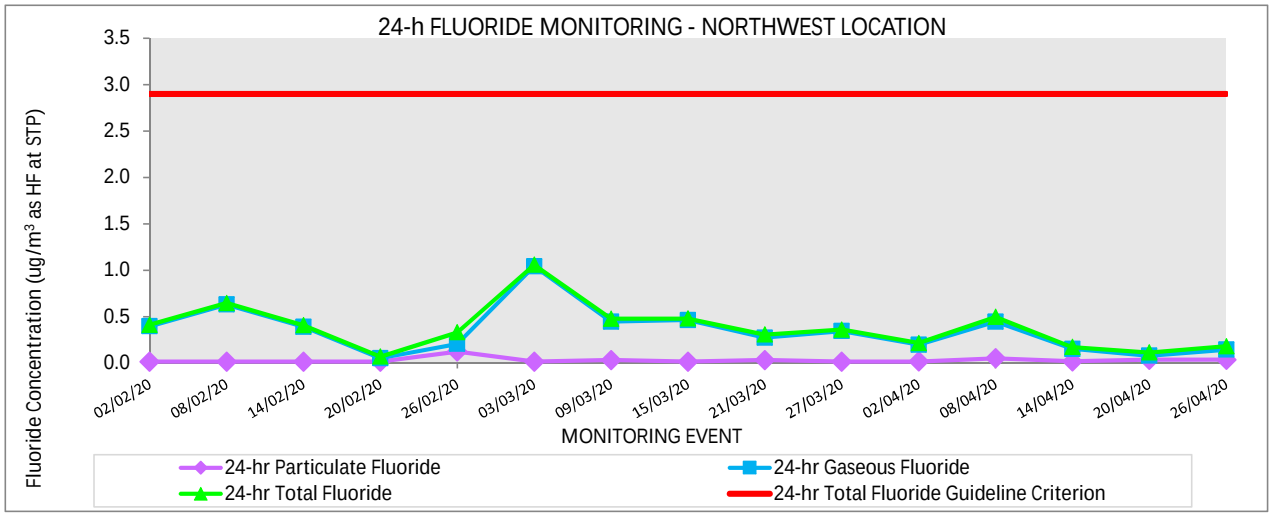
# North West Monitoring Location - 7 Day Fluoride Monitoring

| North West - 7 Day Fluoride Monitoring | | | | | |
|---|---|---|---|---|---|
| January 2020 to April 2020 | | | | | |
| **Monitoring Event** | | **Particulate Fluoride** | **Gaseous Fluoride** | **Total Fluoride** | **7-Day Guideline Criterion** |
| **Start Date** | **End Date** | **(µg/m$^3$ as HF at STP)** | **(µg/m$^3$ as HF at STP)** | **(µg/m$^3$ as HF at STP)** | **(µg/m$^3$ as HF at STP)** |
| 30-Jan-20 | 6-Feb-20 | 0.027 | 0.227 | 0.254 | 1.7 |
| 6-Feb-20 | 13-Feb-20 | 0.018 | 0.037 | 0.055 | 1.7 |
| 13-Feb-20 | 21-Feb-20 | 0.016 | 0.125 | 0.141 | 1.7 |
| 21-Feb-20 | 27-Feb-20 | 0.030 | 0.088 | 0.118 | 1.7 |
| 27-Feb-20 | 5-Mar-20 | 0.040 | 0.257 | 0.297 | 1.7 |
| 5-Mar-20 | 12-Mar-20 | 0.030 | 0.009 | 0.039 | 1.7 |
| 12-Mar-20 | 19-Mar-20 | 0.021 | 0.254 | 0.275 | 1.7 |
| 19-Mar-20 | 26-Mar-20 | 0.075 | 0.154 | 0.229 | 1.7 |
| 26-Mar-20 | 1-Apr-20 | 0.014 | 0.232 | 0.246 | 1.7 |
| 1-Apr-20 | 9-Apr-20 | 0.034 | 0.078 | 0.112 | 1.7 |
| 9-Apr-20 | 16-Apr-20 | 0.016 | 0.072 | 0.088 | 1.7 |
| 17-Apr-20 | 23-Apr-20 | 0.021 | 0.030 | 0.051 | 1.7 |
| 25-Apr-20 | 30-Apr-20 | 0.021 | 0.070 | 0.091 | 1.7 |



# North West Monitoring Location - 24 hour Fluoride Monitoring

| North West - 24 hour Fluoride Monitoring | | | | |
|---|---|---|---|---|
| February 2020 to April 2020 | | | | |
| **Monitoring Event** | **24-hr Particulate Fluoride** | **24-hr Gaseous Fluoride** | **24-hr Total Fluoride** | **24-hr Total Fluoride Guideline Criterion** |
| | **(µg/m³ as HF at STP)** | **(µg/m³ as HF at STP)** | **(µg/m³ as HF at STP)** | **(µg/m³ as HF at STP)** |
| 2-Feb-20 | 0.016 | 0.396 | 0.412 | 2.9 |
| 8-Feb-20 | 0.015 | 0.631 | 0.646 | 2.9 |
| 14-Feb-20 | 0.015 | 0.392 | 0.407 | 2.9 |
| 20-Feb-20 | 0.016 | 0.052 | 0.068 | 2.9 |
| 26-Feb-20 | 0.124 | 0.207 | 0.331 | 2.9 |
| 3-Mar-20 | 0.015 | 1.043 | 1.058 | 2.9 |
| 9-Mar-20 | 0.032 | 0.446 | 0.478 | 2.9 |
| 15-Mar-20 | 0.016 | 0.463 | 0.479 | 2.9 |
| 21-Mar-20 | 0.033 | 0.273 | 0.306 | 2.9 |
| 27-Mar-20 | 0.016 | 0.345 | 0.361 | 2.9 |
| 2-Apr-20 | 0.017 | 0.198 | 0.215 | 2.9 |
| 8-Apr-20 | 0.051 | 0.446 | 0.497 | 2.9 |
| 14-Apr-20 | 0.018 | 0.154 | 0.172 | 2.9 |
| 20-Apr-20 | 0.035 | 0.079 | 0.114 | 2.9 |
| 26-Apr-20 | 0.036 | 0.144 | 0.180 | 2.9 |

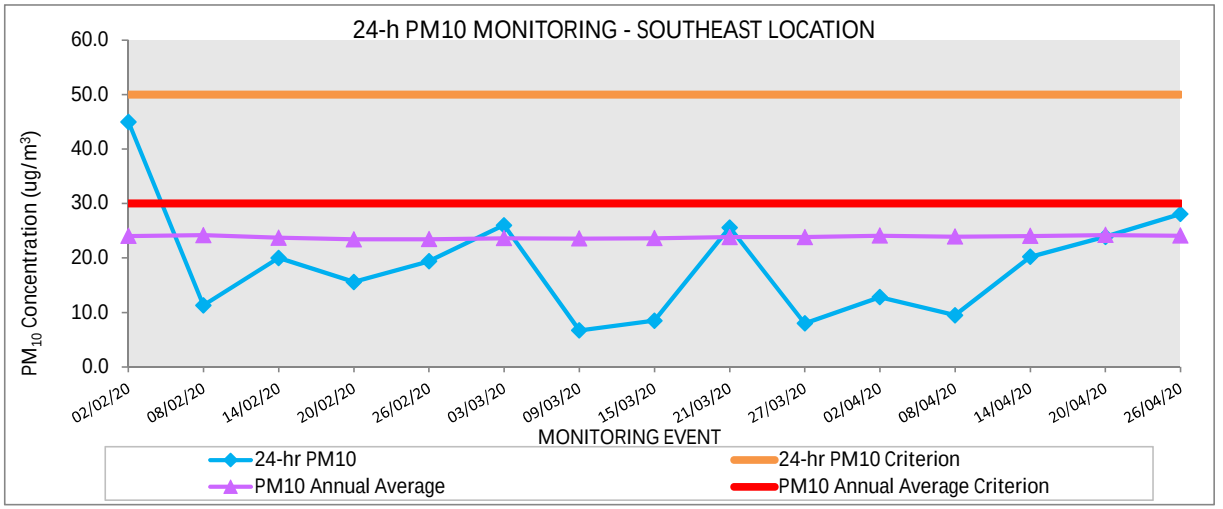


# South East Monitoring Location - 24 hour PM10 Monitoring

| South East - 24 hour PM10 Monitoring |
|---|
| February 2020 to April 2020 |

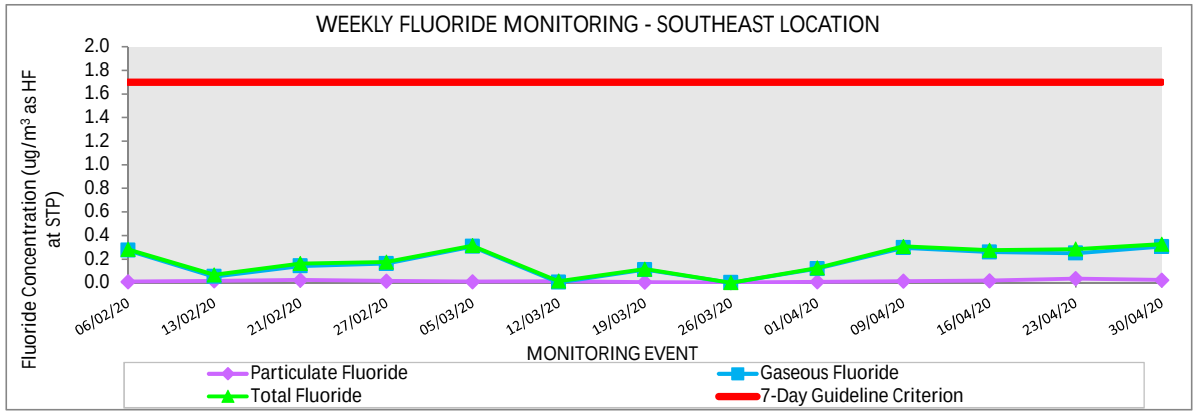
| Monitoring Event | 24-hr $PM_{10}$ ($\mu g/m^3$) | 24-hr $PM_{10}$ Criterion ($\mu g/m^3$) | $PM_{10}$ Annual Average ($\mu g/m^3$) | $PM_{10}$ Annual Average Criterion |
|---|---|---|---|---|
| 02-Feb-20 | 45.0 | 50 | 24.0 | 30 |
| 08-Feb-20 | 11.3 | 50 | 24.2 | 30 |
| 14-Feb-20 | 20.0 | 50 | 23.7 | 30 |
| 20-Feb-20 | 15.6 | 50 | 23.4 | 30 |
| 26-Feb-20 | 19.4 | 50 | 23.4 | 30 |
| 03-Mar-20 | 26.0 | 50 | 23.6 | 30 |
| 09-Mar-20 | 6.7 | 50 | 23.6 | 30 |
| 15-Mar-20 | 8.5 | 50 | 23.6 | 30 |
| 21-Mar-20 | 25.6 | 50 | 23.8 | 30 |
| 27-Mar-20 | 8.0 | 50 | 23.8 | 30 |
| 02-Apr-20 | 12.8 | 50 | 24.1 | 30 |
| 08-Apr-20 | 9.5 | 50 | 23.9 | 30 |
| 14-Apr-20 | 20.2 | 50 | 24.0 | 30 |
| 20-Apr-20 | 23.9 | 50 | 24.2 | 30 |
| 26-Apr-20 | 28.1 | 50 | 24.1 | 30 |

**Bold denotes exceedance**



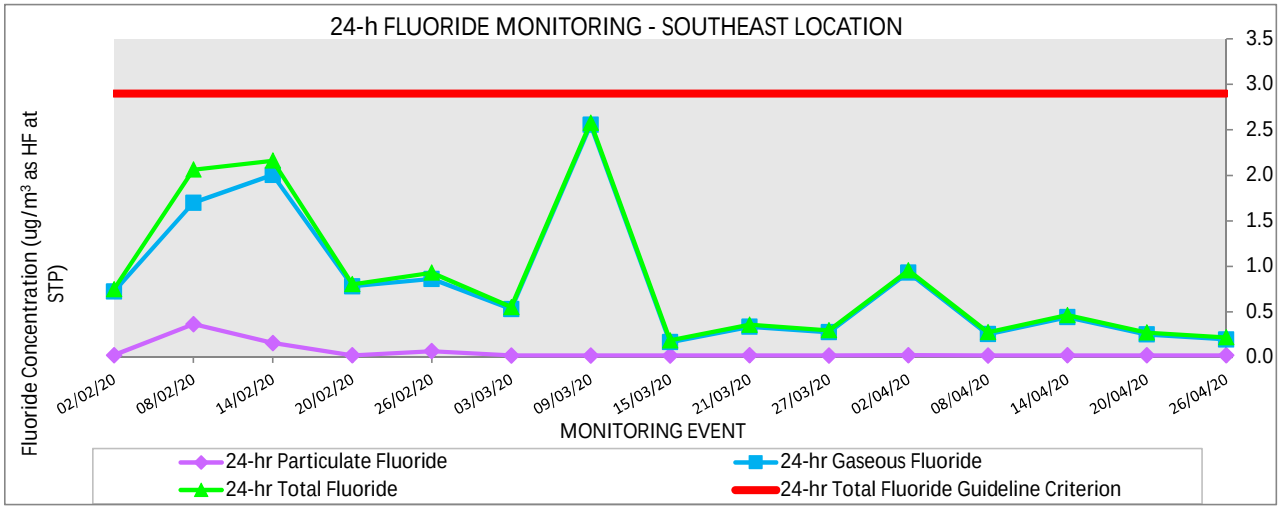
# South East Monitoring Location - 7 Day Fluoride Monitoring

| South East - 7 Day Fluoride Monitoring | | | | | |
|---|---|---|---|---|---|
| January 2020 to April 2020 | | | | | |
| **Monitoring Event** | | **Particulate Fluoride** | **Gaseous Fluoride** | **Total Fluoride** | **7-Day Guideline Criterion** |
| **Start Date** | **End Date** | **(µg/m³ as HF at STP)** | **(µg/m³ as HF at STP)** | **(µg/m³ as HF at STP)** | **(µg/m³ as HF at STP)** |
| 30-Jan-20 | 6-Feb-20 | 0.008 | 0.272 | 0.280 | 1.7 |
| 6-Feb-20 | 13-Feb-20 | 0.015 | 0.050 | 0.065 | 1.7 |
| 13-Feb-20 | 21-Feb-20 | 0.022 | 0.140 | 0.162 | 1.7 |
| 21-Feb-20 | 27-Feb-20 | 0.014 | 0.160 | 0.174 | 1.7 |
| 27-Feb-20 | 5-Mar-20 | 0.008 | 0.306 | 0.314 | 1.7 |
| 5-Mar-20 | 12-Mar-20 | 0.011 | 0.002 | 0.013 | 1.7 |
| 12-Mar-20 | 19-Mar-20 | 0.005 | 0.109 | 0.114 | 1.7 |
| 19-Mar-20 | 26-Mar-20 | * | * | * | 1.7 |
| 26-Mar-20 | 1-Apr-20 | 0.006 | 0.117 | 0.123 | 1.7 |
| 1-Apr-20 | 9-Apr-20 | 0.013 | 0.294 | 0.307 | 1.7 |
| 9-Apr-20 | 16-Apr-20 | 0.016 | 0.258 | 0.274 | 1.7 |
| 16-Apr-20 | 23-Apr-20 | 0.035 | 0.249 | 0.284 | 1.7 |
| 23-Apr-20 | 30-Apr-20 | 0.022 | 0.304 | 0.326 | 1.7 |



# South East Monitoring Location - 24 hour Fluoride Monitoring

| South East - 24 hour Fluoride Monitoring | | | | |
|---|---|---|---|---|
| February 2020 to April 2020 | | | | |
| **Monitoring Event** | **24-hr Particulate Fluoride** | **24-hr Gaseous Fluoride** | **24-hr Total Fluoride** | **24-hr Total Fluoride Guideline Criterion** |
| | **(µg/m$^3$ as HF at STP)** | **(µg/m$^3$ as HF at STP)** | **(µg/m$^3$ as HF at STP)** | **(µg/m$^3$ as HF at STP)** |
| 2-Feb-20 | 0.024 | 0.725 | 0.749 | 2.9 |
| 8-Feb-20 | 0.365 | 1.698 | 2.063 | 2.9 |
| 14-Feb-20 | 0.158 | 2.004 | 2.162 | 2.9 |
| 20-Feb-20 | 0.023 | 0.780 | 0.803 | 2.9 |
| 26-Feb-20 | 0.069 | 0.861 | 0.930 | 2.9 |
| 3-Mar-20 | 0.021 | 0.531 | 0.552 | 2.9 |
| 9-Mar-20 | 0.021 | 2.557 | 2.578 | 2.9 |
| 15-Mar-20 | 0.021 | 0.166 | 0.187 | 2.9 |
| 21-Mar-20 | 0.022 | 0.336 | 0.358 | 2.9 |
| 27-Mar-20 | 0.021 | 0.276 | 0.297 | 2.9 |
| 2-Apr-20 | 0.024 | 0.931 | 0.955 | 2.9 |
| 8-Apr-20 | 0.021 | 0.254 | 0.275 | 2.9 |
| 14-Apr-20 | 0.023 | 0.441 | 0.464 | 2.9 |
| 20-Apr-20 | 0.022 | 0.251 | 0.273 | 2.9 |
| 26-Apr-20 | 0.022 | 0.197 | 0.219 | 2.9 |

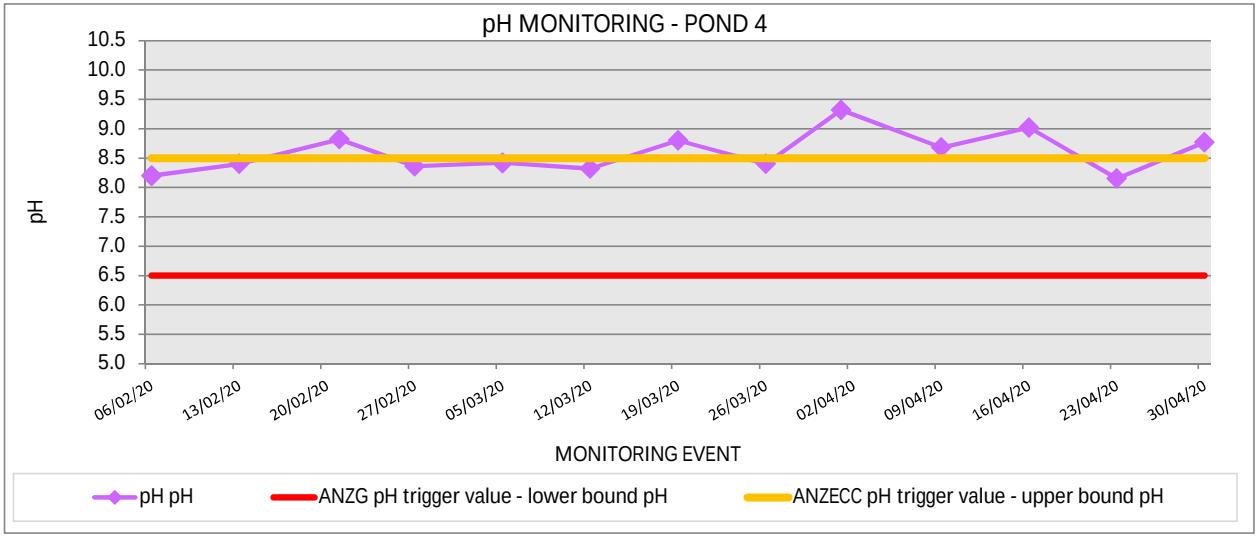


# Pond 4 Monitoring Location - Weekly pH Monitoring

| Pond 4 - Weekly pH Monitoring |
|---|
| February 2020 to April 2020 |

| Monitoring Event | pH | ANZG pH trigger value - lower bound | ANZECC pH trigger value - upper bound | Unable to Sample |
|---|---|---|---|---|
| | pH | pH | pH | |
| 6-Feb-20 | 8.20 | 6.5 | 8.5 | |
| 13-Feb-20 | 8.40 | 6.5 | 8.5 | |
| 21-Feb-20 | **8.82** | 6.5 | 8.5 | |
| 27-Feb-20 | 8.36 | 6.5 | 8.5 | |
| 5-Mar-20 | 8.42 | 6.5 | 8.5 | |
| 12-Mar-20 | 8.32 | 6.5 | 8.5 | |
| 19-Mar-20 | **8.80** | 6.5 | 8.5 | |
| 26-Mar-20 | 8.40 | 6.5 | 8.5 | |
| 1-Apr-20 | **9.32** | 6.5 | 8.5 | |
| 9-Apr-20 | **8.68** | 6.5 | 8.5 | |
| 16-Apr-20 | **9.02** | 6.5 | 8.5 | |
| 23-Apr-20 | 8.15 | 6.5 | 8.5 | |
| 30-Apr-20 | **8.77** | 6.5 | 8.5 | |

**Bold** denotes guidline exceedance

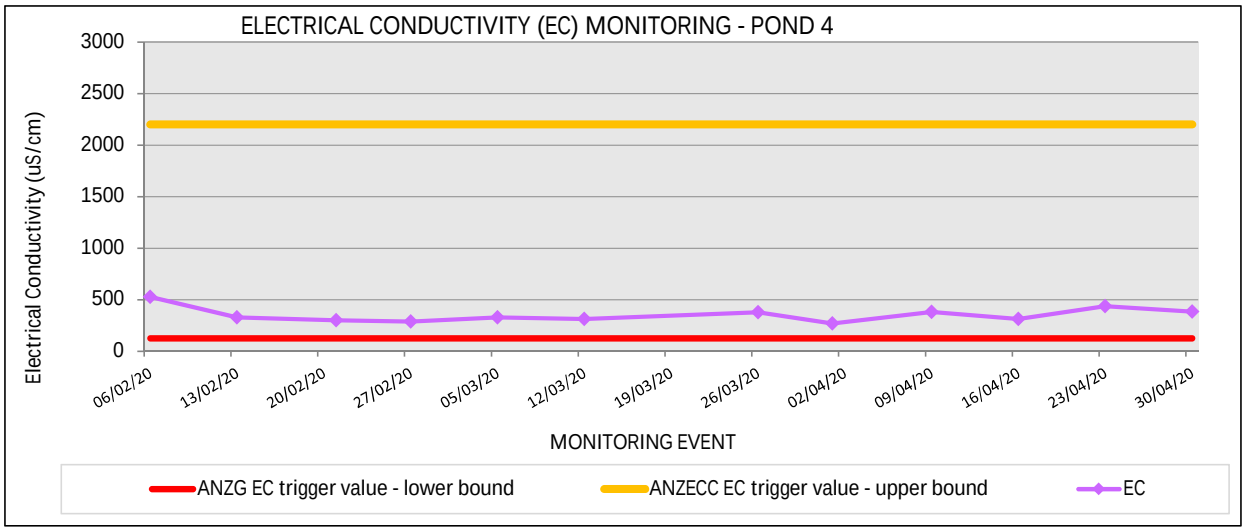


# Pond 4 Monitoring Location - Weekly EC Monitoring

| Pond 4 - Weekly EC Monitoring |
|---|
| February 2020 to April 2020 |

| Monitoring Event | EC | ANZG EC trigger value - lower bound | ANZECC EC trigger value - upper bound | Unable to Sample |
|---|---|---|---|---|
| | µS/cm | µS/cm | µS/cm | |
| 6-Feb-20 | 527 | 125 | 2200 | |
| 13-Feb-20 | 327 | 125 | 2200 | |
| 21-Feb-20 | 300 | 125 | 2200 | |
| 27-Feb-20 | 287 | 125 | 2200 | |
| 5-Mar-20 | 327 | 125 | 2200 | |
| 12-Mar-20 | 312 | 125 | 2200 | |
| 19-Mar-20 | | 125 | 2200 | |
| 26-Mar-20 | 379 | 125 | 2200 | |
| 1-Apr-20 | 269 | 125 | 2200 | |
| 9-Apr-20 | 380 | 125 | 2200 | |
| 16-Apr-20 | 312 | 125 | 2200 | |
| 23-Apr-20 | 436 | 125 | 2200 | |
| 30-Apr-20 | 385 | 125 | 2200 | |

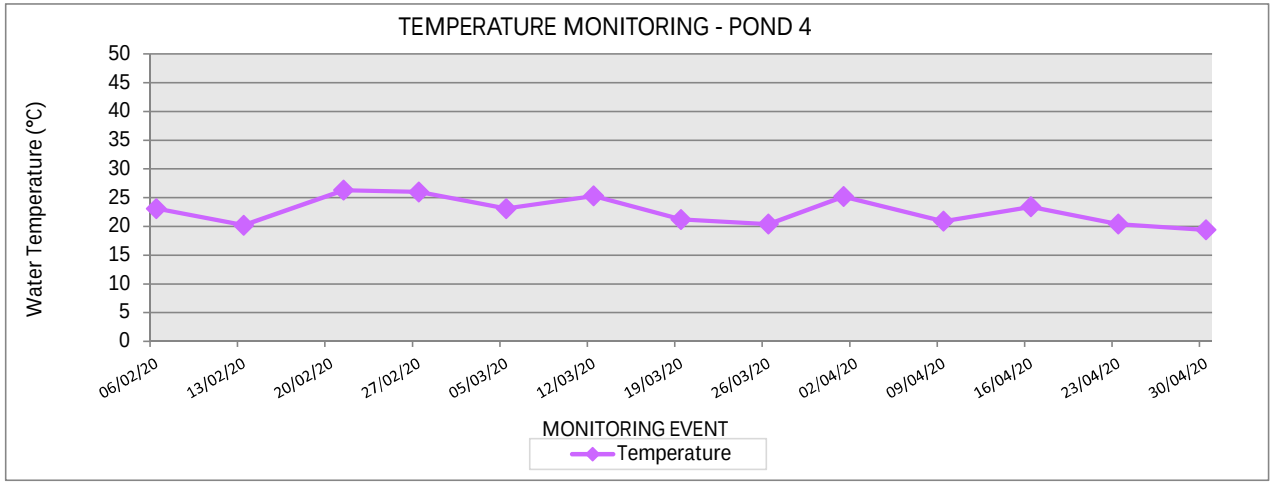
Note: 19 March EC result deemed erroneous

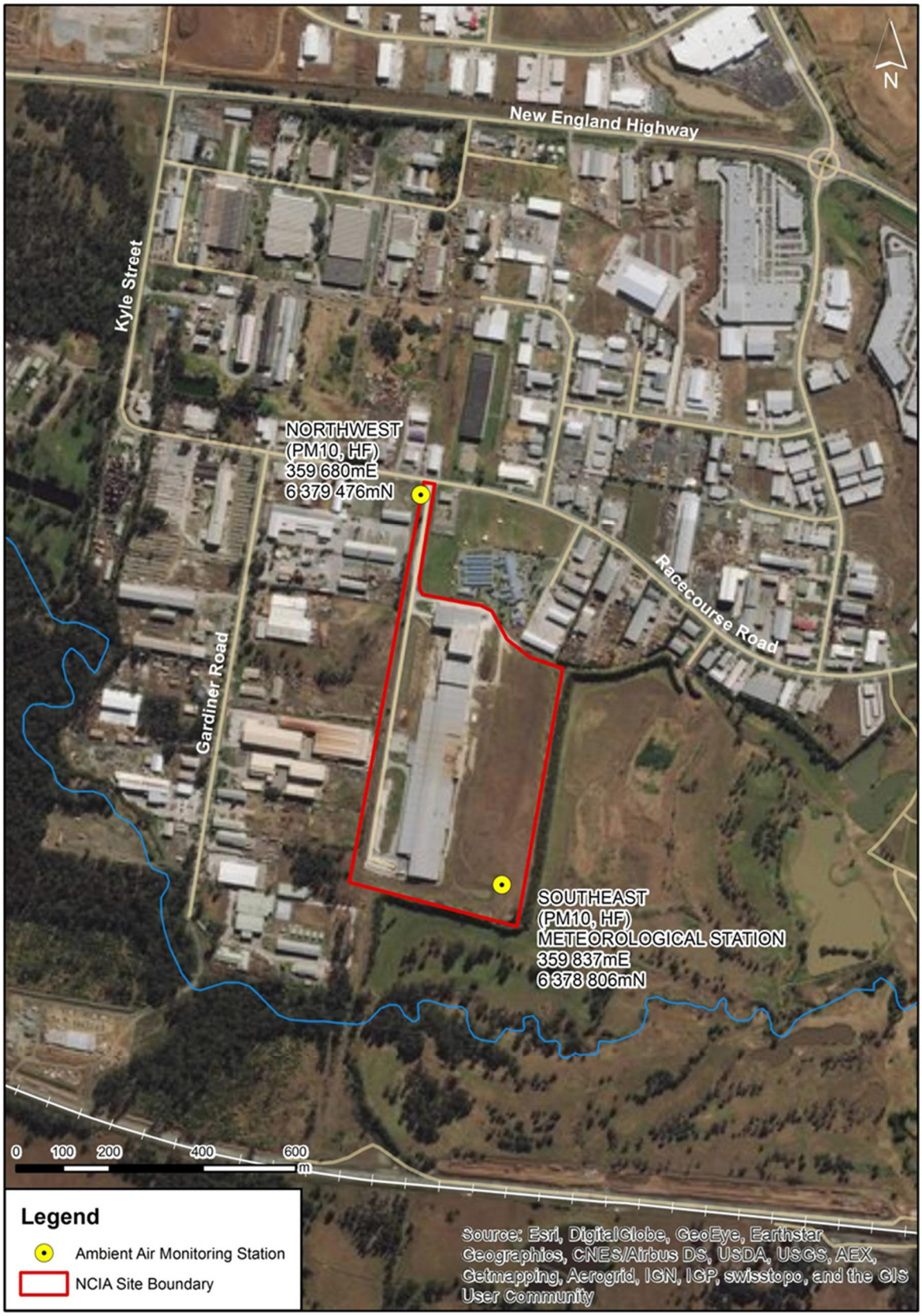


# Pond 4 Monitoring Location - Weekly Temperature Monitoring

| Pond 4 - Weekly Temperature Monitoring |
|---|
| February 2020 to April 2020 |

| Monitoring Event | Temperature °C | Unable to Sample |
|---|---|---|
| 6-Feb-20 | 23.1 | |
| 13-Feb-20 | 20.2 | |
| 21-Feb-20 | 26.3 | |
| 27-Feb-20 | 26.0 | |
| 5-Mar-20 | 23.1 | |
| 12-Mar-20 | 25.3 | |
| 19-Mar-20 | 21.2 | |
| 26-Mar-20 | 20.4 | |
| 1-Apr-20 | 25.2 | |
| 9-Apr-20 | 20.9 | |
| 16-Apr-20 | 23.4 | |
| 23-Apr-20 | 20.4 | |
| 30-Apr-20 | 19.4 | |



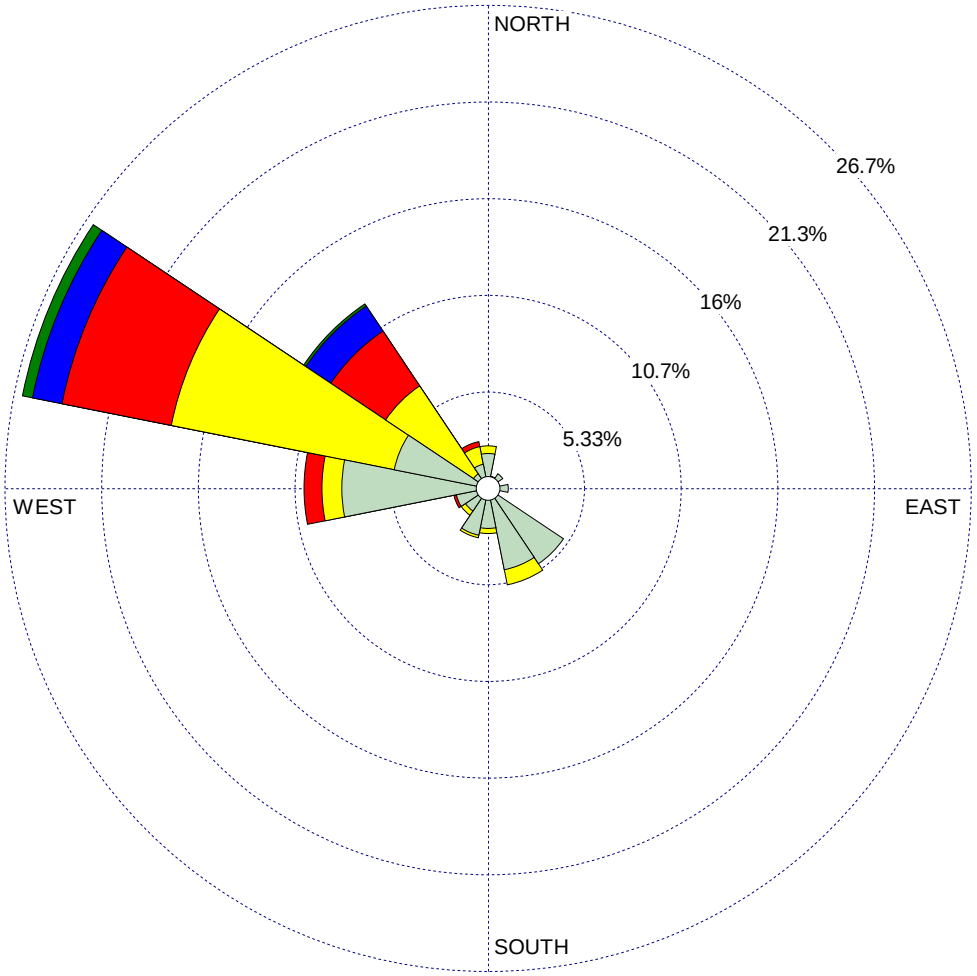

N
New England Highway
Kyle Street
Gardiner Road
Racecourse Road
NORTHWEST
(PM10, HF)
359 680mE
6 379 476mN
SOUTHEAST
(PM10, HF)
METEOROLOGICAL STATION
359 837mE
6 378 806mN
0 100 200 400 600
m
Legend
Ambient Air Monitoring Station
NCIA Site Boundary
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

WIND ROSE PLOT:

**NCIA Meteorology Data**
**April 2020**

DISPLAY:

**Wind Speed**
**Direction (blowing from)**




WIND SPEED
(m/s)

- >= 11.10
- 8.80 - 11.10
- 5.70 - 8.80
- 3.60 - 5.70
- 2.10 - 3.60
- 0.50 - 2.10

Calms: 23.33%

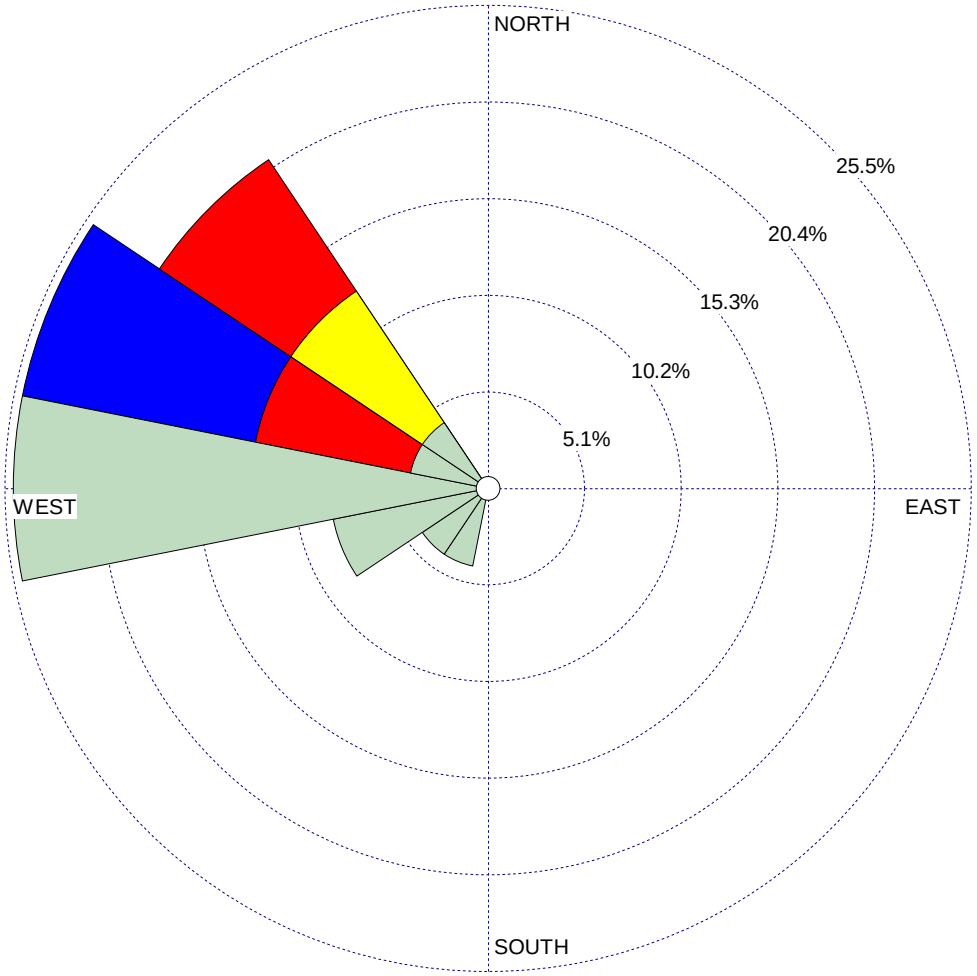
| | | | |
|---|---|---|---|
| COMMENTS: | DATA PERIOD:<br>**Start Date: 1/04/2020 - 00:00**<br>**End Date: 30/04/2020 - 23:00** | COMPANY NAME: | |
| | | MODELER: | |
| | CALM WINDS:<br>**23.33%** | TOTAL COUNT:<br>**719 hrs.** | |
| | AVG. WIND SPEED:<br>**1.86 m/s** | DATE:<br>**8/05/2020** | PROJECT NO.:<br>**60613063** |

WIND ROSE PLOT:

**NCIA Meteorology Data**
**26 April 2020**

DISPLAY:

**Wind Speed**
**Direction (blowing from)**




WIND SPEED
(m/s)

- >= 11.10
- 8.80 - 11.10
- 5.70 - 8.80
- 3.60 - 5.70
- 2.10 - 3.60
- 0.50 - 2.10

Calms: 12.50%

| | | | |
|---|---|---|---|
| COMMENTS: | DATA PERIOD:<br>**Start Date: 26/04/2020 - 00:00**<br>**End Date: 26/04/2020 - 23:00** | COMPANY NAME: | |
| | | MODELER: | |
| | CALM WINDS:<br>**12.50%** | TOTAL COUNT:<br>**24 hrs.** | |
| | AVG. WIND SPEED:<br>**2.35 m/s** | DATE:<br>**8/05/2020** | PROJECT NO.:<br>**60613063** |